REMARKS

Claims 33-42, 44, 47-55 and 87-102 are pending in the instant application. Claims 56-86 have been cancelled from the present application, but Applicant does not abandon the invention described therein. New Claims 100-102 have been added. These claims are discussed in more detail below. Support for these claims is provided by, for example, Examples 1-7 of the specification.

The present Amendment is being filed in a continuing effort to provoke an interference with U.S. Patent No. 6,027,766. Applicant has responded to three Office Actions which have repeated criticisms of the copied claims. All of the criticisms have been addressed in the two previously submitted Declarations Under 37 C.F.R. § 1.132 by Dr. Richard McCurdy. Attached hereto is yet another Declaration (a Second Supplemental Declaration Under 37 C.F.R. § 1.132 by Dr. McCurdy). This application is not being handled with the special dispatch that is appropriate. For the reasons discussed below, immediate referral of this Application to the Board of Patent Appeals and Interferences for declaration of an interference is appropriate.

The interview conducted on April 28, 2004, with the undersigned is gratefully acknowledged. To date, an Interview Summary Record has not been received from the Examiner. A Statement of Substance of Interview was filed by Applicant on May 28, 2004. Further comments on the interview are provided below.

During the interview, the Examiner as well as Supervisory Patent Examiner Shrive Beck both indicated that, subject to some further review, the data presented in the two previously submitted Declarations of Dr. Richard McCurdy showed that the titanium coatings deposited in accordance with Example 1 of the specification were crystalline and exhibited the

photocatalytically-activated self-cleaning reaction rates identified in the Declarations (8.1 x $10^{-3}cm^{-1}min.^{-1}$ (Sample 1), 9.1 x $10^{-3}cm^{-1}min.^{-1}$ (Sample 2) and 10.2 x $10^{-3}cm^{-1}min.^{-1}$ (Sample 3)).

It was also discussed that claims in accordance with the examples should be free of the rejections contained in the final Office Action dated August 29, 2003. Accordingly, without admitting that the remaining rejections of the broader claims is appropriate, Claim 42 has been amended to recited the parameters of Example 1, and presented in this Amendment are new Claims 100-102. Claims 100-102 recite the process parameters of Example 7 which is an example in which float glass is coated with titanium dioxide during manufacture. The new claims recite the total flow rate of the precursor gas mixture. This information combined with the volume percentages of the individual components allows one to calculate the flow rates of the individual components.

All of the claims being examined now relate to float glass manufacture of titanium dioxide coated, photocatalytically-activated, self-cleaning glass. Examples 6 and 7 describe examples carried out in accordance with the invention in which float glass is manufactured which has a crystalline coating of titanium dioxide thereon that like, in Example 1, renders the glass photocatalytically-activated, self-cleaning. The same procedures were carried out in Examples 6 and 7 of the present application. See, page 22 of the specification, lines 2 and 3.

Entry of the new claims is requested.

Referring now to the Office Action dated May 11, 2004, Claims 33-42, 44, and 47-55 have again been rejected under 35 U.S.C. § 112, first paragraph, as assertedly failing to comply with the written description requirement. Specifically, it is asserted that "the claim(s) contain

subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention."

The specific grounds of this rejection are as follows:

1. In Claim 33, line 10, the term "in the crystalline phase" has been deemed new matter. (It is noted that "the same issue applies to claims 35, 41, 47, 49, 51, 55.")

2. In Claim 33, line 10, the term "photocatalytically-activated self-cleaning coating" has been deemed new matter. (It is also noted that "the same issue applies to claims 35, 37, 40-43, 47, 49, 51, 54, 55.")

3. In Claim 37, the phrase "to form a dimensionally stable glass float ribbon" has been deemed new matter. (It is noted that "the same issue applies to claim 51.")

4. In Claim 42, lines 6-7, the phrase "said silica layer inhibits migration of sodium ions from the surface of said article to said photocatalytically activated self-cleaning coating" has been deemed new matter.

5. In Claim 47, the limitation "said coating has a photocatalytically-activated self-cleaning reaction rate of at least about 8.1×10^{-3} to 9.1×10^{-3} cm^{-1} min^{-1}" has been deemed new matter. (It is noted that "the same issue applies to claim 49, 51, 55.")

In connection with maintaining the foregoing rejection, the Examiner has reiterated several points from the previous Office Actions. These are summarized here and addressed below.

The Examiner again asserts that there were "variations" in the data discussed in the specification, and "this may result in the claimed characteristics." According to the Examiner,

the Applicant has not rebutted the Examiner's position and, regardless, Applicant has not utilized the same line speed of the original specification and hence, may have produced different results. The Examiner again concludes that "there is no conclusive evidence that these [variations] did not produce the claimed characteristics [and, it] should be noted that nowhere in the McCurdy application is there any mention that the above parameters would not indeed influence the claimed properties."

The Examiner also takes the position in the most recent Office Action that even if it could be established that the claimed characteristics would be inherent to the claimed process, "the claims as presently written do not recite these limitations." According to the Examiner, Applicant would need to include the parameters recited in the examples in order for the "new matter" rejection to be withdrawn.

The Examiner again also faults the previous showing on the basis that "there is no mention of the annealing properties including rate, temperature, atmosphere, heating source nor is there any mention of substrate purity, substrate crystallinity, processing pressure, precursor purity–any or all of which can account for the claimed characteristics."

At page 5 of the Office Action, the Examiner states that "applicant's specification requires a precursor mixture temperature of 300-950°C (p. 17 lines 18-23) [but] applicant has not provided any factual evidence that the process would necessarily form a crystalline TiO_2 film that is photocatalytically-activated self-cleaning throughout the entire broad range."

At pages 5 and 6 of the Office Action, the Examiner asserts that "with respect to the Declarant arguing that no other properties affect the coating, . . . no factual evidence supporting same were provided, [and] parameters are conventionally varied in routine experimentation to

optimize the coating properties [such that it] seems implausible that there would be no effect on the coating in the absence of a showing of factual evidence.

With regard to the phrase "dimensionally stable", the Examiner takes the position on page 6 of the Office Action that "Applicant has not established that it is conventional that the glass would be dimensionally stable upon cooling" *See*, page 6 of the Office Action.

In the paragraph bridging pages 6 and 7, the Examiner takes the position that "nowhere in the instant claim [Claim 47] is there any recitation of a glass substrate, [and] there is no reason for the skilled artisan to believe that a barrier layer could prevent migration of sodium ions from any article of manufacture."

Applicant respectfully traverses this rejection for the following reasons.

As an initial matter, it should be noted that the Examiner has reinstated portions of the rejection that he previously indicated have been dropped. This has been done with no explanation.

The Examiner indicated in the Advisory Action dated January 30, 2004, that the portion of the rejection criticizing the phrase "to form a dimensionally stable glass float ribbon" has been withdrawn. *See*, page 2 of the Advisory Action ("Applicant next argues that several phrases are not new matter as they are conventional aspects of float glass processes (pp. 7-8). The Examiner agrees and will withdraw this portion of the rejection.") At pages 7 and 8 of the Rule 116 Response filed October 27, 2003, Applicant argued that the phrase "to form a dimensionally stable glass float ribbon" was a conventional aspect of float glass processes, and simply referred to the glass float ribbon having dimensions (thickness and width) which are stable as a result of a ribbon cooling into a sheet of glass that would ultimately be cut into plates of glass.

The Examiner now takes the position that "Applicant has not established that it is conventional that the glass would be dimensionally stable upon cooling." *See*, above.

Applicant respectfully submits, however, that the Examiner's position is illogical. It is a matter of common sense that the glass is dimensionally stable after cooling. It will necessarily have dimensions (thickness and width) that are stable. Withdrawal of this portion of the rejection is appropriate.

Without admitting this portion of the rejection is correct, Applicant has deleted the phrase "dimensionally stable" from Claims 37 and 51. Accordingly, withdrawal of this portion of the rejection is requested.

Similarly, the Examiner criticizes the phrase "said silica layer inhibits migration of sodium ion from the surface of said article to said photocatalytically activated self cleaning coating." The Examiner takes the position that the criticized claims do not recite a glass substrate and therefore the patent and textbooks referred to by Applicant to show that a silica layer would inherently inhibit migration of sodium ions are not relevant.

Claims 47, 49, 51 and 55 recite a glass float (Claims 47; 49 and 51) ribbon and a glass article (Claim 55). These are glass substrates as would be readily apparent to one of ordinary skill in the art. This portion of the rejection is clearly wrong and should be withdrawn. There is ample evidence that a silica barrier layer prevents migration of sodium ions. *See*, the patent and book referred to on page 8 of the Rule 116 Response filed October 27, 2003.

The remainder of the rejection is directed to repeating criticisms that have been addressed previously, particularly in Dr. McCurdy's Supplemental Declaration Under 37 C.F.R. § 1.132. That is, as mentioned above, the Examiner again criticizes the previous showing on the basis that

there are "variations" and differences in line speed that Dr. McCurdy has not addressed. Nothing could be more inaccurate and to demonstrate the same, below is a quotation of the text from paragraphs 3-5 of Dr. McCurdy's Supplemental Declaration.

> 3. Referring to page 3 of the Advisory Action, it is indicated that Applicant has not rebutted the Examiner's position with respect to the difference in line speed between Example 1 of the above referenced application and the additional experimental work that is summarized in my original Rule 132 Declaration. In particular, it is indicated that "the applicant has not utilized the same line speed or the use of a silica coating as that of the original specification and hence, may have produced different results ... [t]here is no conclusive evidence that these did not produce the claimed characteristics."
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> 4. In response, I would like to point out that two different samples were produced for the declaration: the first sample (Sample 1) was produced according to Example 1 of the above-referenced application and the second sample (Sample 2) was produced according to the same Example 1 of the above-referenced application but with a slower linespeed. By slowing the linespeed, which is a common technique in the art, the substrate is exposed to the chemical flows for a longer period of time which consequently grows a thicker film. Reducing the linespeed was done for the second sample in order to produce the same coating as the first but with an increased thickness in order to improve the signal-to-noise ratio of the X-ray diffraction measurement that is used to establish crystallinity.
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> 5. Attachments A and B of my original Declaration (attached again hereto for convenience) are the X-ray diffraction patterns of the first and second samples, respectively. One can see from Attachment A that there is a broad diffraction peak centered at roughly 24.5 degrees, the location of the principal peak of anatase titanium oxide. The standard library power diffraction file for anatase titanium oxide is also shown in the figure (file 21-1272) for reference. This is clear evidence that by replicating Example 1 of the above-referenced application, an anatase titanium oxide coating was produced. The X-ray diffraction pattern for the second sample is shown in Attachment B. Here one finds that not only is the primary peak of the titanium oxide diffraction pattern found (as in the first sample) but we are also seeing secondary and tertiary peaks in Sample 2 that further confirm the coating identification as anatase titanium oxide. With the thicker film made by decreasing the linespeed, one sees that the signal-to-noise ratio of the spectra is significantly improved as well as a

> sharpening of the peaks. The peak width narrows as a result of the larger crystallites inherent in the thicker sample. In conclusion, both samples A and B produced anatase titanium oxide films and the difference between the two samples is specifically due to the differences in film thickness between the two samples.

Thus, Example 1 was reproduced exactly as it occurred. Additional samples were prepared in order to confirm the crystallinity of the coating, i.e., improve the signal to noise ratio. The increased thickness does not affect the characteristics of the TiO_2 coating that are being measured. There were no "variations" or differences in line speed that undermines the data.

At the bottom of page 4, the Examiner suggests that only the specific conditions of Example would result in a photocatalytically-activated, self-cleaning coating.

Applicant disagrees. The claimed invention results in a photocatalytically-activated, self-cleaning coating. While not admitting that this rejection is appropriate, Claim 42 has been amended to recite the parameters of Example 1 of the instant Application. Similarly, new Claims 100-102 have been added. These claims recite the parameters of Example 7. Applicant also attaches hereto a Second Supplemental Declaration of Dr. McCurdy reproducing Examples 2, 5 and 7 of the instant Application and confirming that the coating prepared in accordance with those examples was crystalline and photocatalytically-activated, self-cleaning.

The Examiner next faults the previous showing on the basis that there is no mention of annealing properties, substrate purity, substrate crystallinity processing pressure, precursor purity. This is another criticism that has been repeated from the previous Office Actions despite the fact that Dr. McCurdy has fully addressed and rebutted it in his Declarations.

The following portion of Dr. McCurdy's Supplemental Declaration filed March 1, 2004, is directly on point.

> 9. The Examiner also states that no mention of annealing properties, substrate purity, etc. were made and that any or all of which can account for the claimed characteristics. The Examiner is correct that annealing characteristics (especially a secondary separate annealing cycle) can affect photocatalytic activity of some titanium oxide self-cleaning coatings. This effect is most often seen with low temperature deposited films (<600C) when combined with an annealing temperature which exceeds the deposited temperature or when the annealing temperature is similar but annealing time significantly longer that the cooling during the initial preparation. See, for example, U.S. Patent No. 6,027,766, in particular, col. 7, line 36 through col. 8, line 7. This secondary annealing cycle is commonly used with films that have little or no self-cleaning features as deposited where the annealing step is critical to either crystallize the film into anatase titanium oxide or to increase the anatase content of the crystalline film to produce the required self-cleaning functions. The films described in both Example 1 of the above-referenced application and my original Declaration are high content anatase titanium oxide as deposited and as such do not need a subsequent annealing step. The films were cooled down in ambient air under no special conditions after deposition demonstrating that the criticality of annealing parameters for my films on the self-cleaning function is nonexistent. Similarly, the other stated parameters by the Examiner are also not material to the invention. Substrate purity is not important as the films are deposited on top of a silica coating that inhibits effects of the substrate. Substrate crystallinity is not important as both the float glass substrate and the silica underlayer are both amorphous. Processing pressure and process purity are equally irrelevant as film growth rate and film properties are insensitive to changes in process pressure in the range of interest (near atmospheric pressure) and reagents used in the invention were common reagent grade chemicals with no subsequent purification prior to use. In summary, the processes described in Example 1 of the above referenced application and my original Declaration are sufficient for one skilled in the art to produce an anatase titanium oxide coated piece of glass with self-cleaning photocatalytic activity. Minor process changes may affect film thickness or optical properties such as reflection but not the intrinsic crystal structure or photocatalytic activity of the product.

Thus, the films of the present invention are high anatase content films as deposited and do not need a secondary annealing step. When claims were copied from the PPG patent, an annealing step was recited in order to copy claims as closely as possible. *See,* for example,

Claims 33 and 35. There is support in the instant application for an optional anneal (*see*, the annealing lehr referred to on page 16 of the specification, line 11). Substrate purity is also not an issue because of the silica coating. Substrate crystallinity is not important because of the amorphous nature of the silica layer and glass substrate. Processing pressure and purity are similarly irrelevant for the reasons identified in Dr. McCurdy's Supplemental Declaration.

Near the bottom of page 5 of the Office Action, the Examiner comments that "It should be noted that the applicant's specification requires a precursor mixture temperature of 300-950°C (p.17 lines 18-23). It should be noted that the applicant has not provided any factual evidence that the process would necessarily form a crystalline TiO_2 film that is photocatalytically-activated self-cleaning throughout the entire broad range.". As discussed in Dr. McCurdy's Declarations, however, the temperature of the precursor gas mixture is a qualitative matter. That is, the quality of the coating may be affected by the precursor gas mixture temperature, but in all instances a coating prepared in accordance with the present claims invention will be photocatalytically-activated, self-cleaning. In any event, and without admitting that the Examiner's comment is appropriate, Claim 42 has been amended to recite a precursor gas mixture above 300°F and below the decomposition temperature of ethyl acetate. Claims 100 and 101 recite a temperature of the precursor tower of 400°F and a temperature of the reactor face of 500°F.

Lastly, the Examiner criticizes Applicant for not providing factual evidence that "no other properties affect the coating." See, page 5 and 6 of the Office Action (bridging paragraph). Applicant responds as follows. First, Dr. McCurdy's two Rule 132 Declarations are evidence. Further, he states that the parameters noted by the Examiner (annealing, etc.) do not affect the

data and, in any event, the Examiner is requiring that Applicant prove a negative. The Examiner has the burden in making the rejection. It is submitted that the Examiner has not carried his burden and the rejection should be withdrawn.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

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